

Testimony of

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before

Energy and Technology Committee

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regarding

Raised Bill No. 5681

An Act Concerning Fuel Cells

Introduction

The Connecticut Center for Advanced Technology, Inc. ("CCAT"), offers this testimony in strong support of Raised Bill 5681 - An Act Concerning Fuel Cells.

CCAT is a non-stock, tax-exempt Connecticut corporation that works in partnership with industry, government, and academia to strengthen technology-led economic competitiveness. The Energy Initiative of CCAT has been established to improve the economic competitiveness of the region through solutions that lower energy costs and increase long-term energy reliability. CCAT administers the Connecticut Hydrogen-Fuel Cell Coalition, undertakes energy planning, and promotes renewable energy, including advanced technologies and sustainable fuels. CCAT, in partnership with the Department of Economic and Community Development (DECD), the Department of Transportation, the Connecticut Hydrogen-Fuel Cell Coalition, and the Renewable Energy Investment Fund, developed the state's Plan for Fuel Cell Economic Development (Hydrogen Roadmap). This Hydrogen Roadmap was accepted by DECD and submitted to the General Assembly on February 4, 2008.

The establishment of a fuel cell program is consistent with the goals for Connecticut identified in the state's Hydrogen Roadmap.

The state's Hydrogen Roadmap identified the following goals:

- Support the development of transportation-related fuel cell technology in the state in order to maximize Connecticut technology content in future transportation fuel cell systems;
- Attract automobile and bus companies to demonstrate in Connecticut through infrastructure and legislative support for commercial deployment;

- Accelerate commercial readiness and commercial deployment of hydrogen-fueled vehicles with emphasis on fuel cell vehicles in Connecticut;
- Reduce controlled pollutant and greenhouse gas emissions (GHG) , reduce noise, and increase energy security and efficiency;
- Capture jobs associated with production of vehicles, fueling stations and infrastructure products including component sub-assemblies, original equipment manufacturing and long term product support; and
- Extend Connecticut capture of market content by expanding applications beyond automobiles and buses, applying existing fuel processing capability to fueling stations and increasing vehicle value content by expanding beyond the fuel cell itself to associated vehicles, vehicle subsystems, and hydrogen storage.

The development of a fuel cell program to promote the development and use of fuel cell vehicles and hydrogen is consistent with federal policy.

The U.S. Department of Transportation (USDOT) has issued a plan for development and demonstration of fuel cell buses.¹ The USDOT has established a goal to have ten percent of transit bus purchases be hydrogen fuel cell buses in 2015.² **The development and implementation of a fuel cell program to promote the development and use of fuel cell vehicles and hydrogen would position Connecticut to capture federal and other grant funding for research, development, demonstration and deployment of hydrogen infrastructure and fuel cell vehicles.** The establishment of a fuel cell program for Connecticut would complement global efforts by national governments, vehicle manufacturers, fuel cell manufacturers and hydrogen equipment infrastructure

¹ U.S. Department of Transportation. 2005, "Research, Development, Demonstration and Deployment Roadmap for Hydrogen Vehicles & Infrastructure to Support a Transition to a Hydrogen Economy"

² Sisson, Barbara A. "Hydrogen and Fuel Cell Bus Initiative, Paving the Way Nationally and Internationally", U.S. Department of Transportation, Federal Transit Administration

manufacturers to develop and demonstrate the functional, cost, durability and reliability capabilities of hydrogen infrastructure and fuel cell powered vehicles.

Fuel cell applications can improve energy efficiency, while also improving air quality and environmental performance, enhancing economic development, and increasing employment in Connecticut.

The Hydrogen Roadmap identified and quantified the benefits of using hydrogen and fuel cell technology for stationary and transportation applications to improve efficiency, reduce consumption of fuel, improve the environment, and enhance near-term and long-term economic development, as outlined below:

- Fuel cells and hydrogen technology are clean and nearly emission free. Fuel cell vehicles running on hydrogen produced from renewable resources virtually eliminates all GHG compared to conventional fossil fuel powered vehicles. Replacement of one conventional diesel transit bus with a hydrogen powered fuel cell transit bus would reduce NO_x emissions by 1,019.9 pounds, SO₂ emissions by 1.746 pounds, and CO₂ emissions by 182,984 pounds, annually.
- Fuel cells and hydrogen technology are efficient, will conserve fuel and the import of foreign oil, and reduce energy costs. The average expected energy efficiency using fuel cells for transit buses will be approximately twelve (12) miles per gallon equivalent versus four (4) miles per gallon using diesel fuel.
- Assuming full scale mass production of alternative fueled vehicles, fuel cell powered vehicle total societal lifecycle costs are slightly less than hybrid electric (HE) vehicles and are significantly lower than vehicles with fossil fuel burning internal combustion engines (ICE); and
- Presently, Connecticut's hydrogen and fuel cell industry employs 1,156 employees; an increase of 229 jobs since early 2006. Under existing trends, it is

projected that by the year 2010, Connecticut would be positioned to increase direct employment to over 1,600 jobs.

- It has been estimated that the global fuel cell/hydrogen market, when mature, could generate between \$43 and \$139 billion annually. If fuel cells are deployed as distributed generation and if Connecticut's fuel cell and hydrogen industry captures a significant share of the transportation market, revenues to Connecticut companies in a mature global market could be between approximately \$14 and \$54 billion annually, which would require an employment base of tens of thousands.

Conclusion

The Connecticut Center for Advanced Technology, Inc. is supportive of this Bill that would establish a fuel cell program to promote the development and use of hydrogen and fuel cell technologies to improve energy efficiency to reduce consumption of fuel, improve the environment, and enhance near-term and long-term economic development.

Having developed the Hydrogen Roadmap on behalf of the state, CCAT is uniquely qualified and well staffed with the technical expertise to coordinate the development of a fuel cell program with the Connecticut Department of Transportation, the hydrogen and fuel cell industry, and other interested stakeholders in the state. State and private fleets are excellent applications for initial hydrogen-fueled and fuel cell-powered vehicles. These include: transit buses, delivery fleets, and service vehicles, including those used at Bradley International Airport and other commercial locations. Utilizing existing or planned refueling stations, as well as fleet garages along Connecticut's major highways, are attractive locations for hydrogen fueling stations that could be used for both fleet vehicles as well as vehicles traveling long distances through the northeast states. These sites and opportunities for efficient and effective development have been identified by CCAT through the Hydrogen Roadmap.

CCAT will make itself available to the Committee and legislature upon request to provide or clarify information in the State's Plan for Fuel Cell Economic Development or to assist in the refinement of this legislation. CCAT would be pleased to be considered a resource to assist in the development of the fuel cell program.

Respectfully submitted,

CONNECTICUT CENTER FOR ADVANCED TECHNOLOGY, INC.

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